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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/549,910	Applicant(s) NAKAJIMA ET AL.
	Examiner CYNTHIA SZEWCZYK	Art Unit 4128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 20 September 2005.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 23-52 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 23-52 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 20 September 2005 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 9/20/05, 8/14/07

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____

5) Notice of Informal Patent Application

6) Other: _____

DETAILED ACTION

1. This is the initial office action for NAKAJIMA et al. Application No. 10/549,910 filed September 20, 2005, which is a national stage entry of PCT/JP03/03503 filed March 24, 2003.
2. Claims 23-53 are currently pending and have been considered.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 23, 26, and 36-39 are rejected under 35 U.S.C. 102(b) as being anticipated by HISHINUMA et al (WO 200117922 A1).

HISHINUMA et al. discloses an apparatus for the production of photocatalytic glass sheet wherein titanic acid is sprayed on the surface of the glass to produce a photocatalytic titanium oxide film on the glass (DERWENT abstract) (glass sheet with titanium oxide of instant claim 23). Figures 1 and 2 of HISHINUMA et al. show numerous sprays used on the glass sheet (plural air spray guns of instant claim 26), wherein it appears from the figures that the mist from the spray guns do not overlap as

in instant claim 26. HISHINUMA et al. discloses that the titanium concentration is 1-20% by weight and preferably 2-10% by weight (trans. para. 20), which would incorporate the range of instant claim 36. HISHINUMA et al. notes that a sol is used to make the titanium dioxide (trans. para. 3) as in instant claim 37. HISHINUMA et al. discloses that the thickness of the film can be 0.1-1.0 μm (trans. para. 21) which is within the range in instant claim 38. HISHINUMA et al. discloses that an anatase titanium oxide can be used in the film (DERWENT abstract) (anatase-type titanium oxide of instant claim 39). Since HISHINUMA discloses a similar process to instant claim 23, the surface would have a similar micro roughness as in instant claim 23.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1).

HISHINUMA et al. discloses that an ultrasonic nebulizer can be used to spray the liquid coating (translation para. 16) (ultrasonic spray of instant claim 30). It would have been obvious to set the temperature of the liquid coating higher than the surface temperature because HISHINUMA et al. notes that thermal shock may occur when the mist is sprayed on the glass and is much colder than the glass (trans. para. 12). Reducing the risk of thermal shock would reduce the risk of cracks occurring on the surface of the glass. HISHINUMA et al. discloses that the glass is heated to 600°C or less (trans. para. 12), which would be incorporated within the range in instant claim 32. HISHINUMA et al. discloses that the glass sheet is cooled from 600 °C to 250 °C (trans. para. 15), which would incorporate the range of instant claim 32. Therefore, the claimed invention would have been obvious.

9. Claims 24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of MCMASTER et al. (US 4,240,816).

HISHINUMA et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). HISHINUMA et al. is silent as to whether the film is dried between multiple sprayings. MCMASTER et al. teaches a method and apparatus for the production of a glass sheet having a titanium oxide film. MCMASTER et al. discloses that the sheet is reheated after spraying, which would dry

the film (abstract). It would have been obvious that HISHINUMA et al. would reheat between spraying as well because it must reach a certain temperature for pyrolysis to occur (MCMASTER et al. col. 3, lines 44-48). MCMASTER et al. discloses that heating the sprayed glass forms a metal oxide (abstract). Therefore, the claimed invention would have been obvious.

10. Claims 25, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of GREENSBURG et al. (US 2002/0114945 A1) and DOTY et al. (US 4,689,247).

HISHINUMA et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). HISHINUMA et al. discloses that the glass is heated to 600°C or less (trans. para. 12) before being sprayed with the film as in instant claim 28. Figures 1 and 2 of HISHINUMA et al. show that the spray guns cross the glass plate as it is moved as in instant claim 29. HISHINUMA et al. fails to disclose the operating parameters of the spray guns. GREENBERG et al. and DOTY et al. disclose methods and apparatuses for applying a thin film on glass using a spray pyrolysis process similar to HISHINUMA et al. GREENBERG et al. discloses explicitly that a titanium dioxide is used (para. 6, lines 1) while DOTY et al. suggests that titanium oxide would be possible (col. 11, lines 49-51). GREENBERG et al. discloses an example in which titanium dioxide is sprayed on a glass substrate using spray pyrolysis (example 4) and uses an operating pressure of 0.35 MPa (table 5) which would be incorporated by the range of instant claim 25. DOTY et al. uses an ultrasonic nebulizer

to spray the coating (col. 10, line 29) just as HISHINUMA et al. suggests (translation para. 16). DOTY et al. suggests a delivery rate between about 0.3 – 2.2 mL/min for use with the ultrasonic nebulizer (col. 10, lines 36-37) which would overlap with the range of instant claim 25. It would have been obvious to use the parameters of GREENBERG et al. and DOTY et al. because they both produce the same end product and use a similar method and apparatuses to reach the end product. Therefore, the claimed invention would have been obvious.

11. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of GREENSBURG et al. (US 2002/0114945 A1) and DOTY et al. (US 4,689,247) as applied to claim s 25, 28, and 29 above, and further in view of VAN LAETHEN et al. (US 4,349,372).

HISHINUMA et al. as modified by GREENBERG et al. and DOTY et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film. Modified HISHINUMA et al. is silent as to the distance between the spray guns and the glass substrate. VAN LAETHEN et al. discloses a process for coating glass with a metal compound using spray guns (abstract). VAN LAETHEN et al. discloses that the preferred distance from the spray guns to the substrate is 15-35 cm (col. 5, lines 5-6) which would be incorporated within the range of instant claim 27. It would have been obvious to use the range of VAN LAETHEN et al. in the apparatus of HISHINUMA et al. because they both teach a method for applying a thin film on a glass substrate using a spray gun. Therefore, the claimed invention would have been obvious.

12. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of LEWIS (glass).

HISHINUMA et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). HISHINUMA et al. is silent as to the composition of the glass. The most common type of glass is soda lime glass, which contains about 20% sodium carbonate according to LEWIS, which would contain a percentage of sodium within the range in instant claim 33. Therefore, it would be obvious to use conventional soda lime glass in the process of HISHINUMA et al. Therefore, the claimed invention would have been obvious.

13. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of GREENSBURG et al. (US 2002/0114945 A1).

HISHINUMA et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). HISHINUMA et al. is silent as to the area of the glass and the roughness of the film. GREENSBURG et al. discloses a method for the production of a photocatalytic on a glass substrate (abstract) using spray pyrolysis (para. 20, line 3). GREENBERG et al. discloses that the coating can be titanium oxide (para. 20, line 6). GREENBERG et al. discloses an example in which titanium dioxide is sprayed on a glass substrate using spray pyrolysis (example 4) wherein the sample glass has dimensions of 10.16 cm x 10.16 cm, which would have

an area of 0.01 m². Since the glass used in GREENBERG et al. can be at least 0.01 m² it would be obvious that the range would cover areas of 0.5 m² and above. It would have been obvious to use the same sized glass in the process of HISHINUMA et al. because they both produce a glass substrate with a titanium oxide film by the use of pyrolysis spray. Therefore, the claimed invention would have been obvious.

14. Claims 35 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of DOUSHITA et al. (US 6,156,409).

HISHINUMA et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). HISHINUMA et al. discloses that the substrate is first sprayed with a titanic acid solution (trans. para. 8). HISHINUMA et al. fails to disclose that the substrate is washed with a surfactant-containing aqueous solution and is silent as to the roughness of the film. DOUSHITA et al. discloses a process for producing glass articles with a non-fogging film using metal oxides (abstract). DOUSHITA et al. discloses the use of a surfactant in the film (claim 1). It would be obvious to use a surfactant in the film of HISHINUMA et al. because the surfactant improves the anti-fogging property (col. 8, lines 4-6) and would cover stain constituents (col. 8, lines 16-18) which is a desirable trait in glass sheets. DOUSHITA et al. also discloses that the film has an arithmetic mean roughness of 1.5 to 80 nm (abstract), which would overlap with the range in instant claim 40. It is obvious that the film on the glass of HISHINUMA et al would have the same properties because they

both teach a glass substrate with a titanium oxide film. Therefore, the claimed invention would have been obvious.

15. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of NIWA et al. (US 6,408,743 B2).

HISHINUMA et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). HISHINUMA et al. discloses that if the thickness of the film exceeds 1.0 um, then the luster and haze may be become high and may not be suitable for practical use (trans. para. 21). HISHINUMA et al. is silent as to what values are considered high. NIWA et al. discloses that a glass haze of 5% or less is considered to be desirable, which incorporates the range of instant claim 41. It is obvious that the glass of HISHINUMA et al. would preferably contain a haze of less than 5% because that is considered suitable for practical use. Therefore, the claimed invention would have been obvious.

16. Claims 42-44 and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of MCMASTER et al. (US 4,240,816) and WAIBEL et al. (Properties of TiO_x films).

HISHINUMA et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). HISHINUMA et al. discloses that the glass is heated to 600°C or less (trans. para. 12) which would overlap with the heating range of instant claim 42. HISHINUMA et al. discloses that the glass sheet is

cooled from 600 °C to 250 °C (trans. para. 15) which would overlap with the cooling range of instant claim 42. HISHINUMA et al. discloses that stress is generated after applying the film (trans. para. 18). Therefore, the compressive stress on the glass would increase. Untreated glass has no surface compression, therefore, it would have been obvious that the surface compression of the glass substrate would be under 10 MPa. Table 3 of WAIBEL et al. notes film stress on substrates. WAIBEL et al. discloses that the stress of titanium oxide is 152 MPa, which would fall into the range of instant claim 42. It is obvious that the film of HISHINUMA et al. would have that property because it has a titanium oxide film. MCMASTER et al. discloses that after a sheet of glass is coated with a film, the sheet is brought up to a higher temperature to prepare it for tempering (col. 2, lines 25-27). It would have been obvious that the glass substrate of HISHINUMA et al. was heated after being coated because it would be desirable to temper the glass in order to strengthen it. It would have been obvious through optimization testing that a person having skill in the art could have arrived at the heating time of instant claims 43 and 44. HISHINUMA et al. discloses that the titanium concentration is 1-20% by weight and preferably 2-10% by weight (trans. para. 20), which would incorporate the range of instant claim 48. HISHINUMA et al. notes that a sol is used to make the titanium dioxide (trans. para. 3) as in instant claim 49. HISHINUMA et al. discloses that the thickness of the film can be 0.1-1.0 µm (trans. para. 21) which would overlap with the range in instant claim 50. HISHINUMA et al. warns against using thickness less than 0.1µm since it would be unable to demonstrate sufficient photocatalyst activity (trans. para. 21). HISHINUMA et al. discloses that an

anatase titanium oxide can be used in the film (DERWENT abstract) just as in instant claim 51. Therefore, the claimed invention would have been obvious.

17. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of MCMASTER et al. (US 4,240,816) and WAIBEL et al. (Properties of TiO_x films) as applied to claims 42-44 and 48-51 above, and further in view of LEWIS (glass).

HISHINUMA et al. as modified by MCMASTER et al. and WAIBEL et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). Modified HISHINUMA et al. is silent as to the composition of the glass. The most common type of glass is soda lime glass, which contains about 20% sodium carbonate according to LEWIS, which would contain a percentage of sodium within the range in instant claim 45. It would be obvious to use conventional soda lime glass in the process of modified HISHINUMA et al. Therefore, the claimed invention would have been obvious.

18. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of MCMASTER et al. (US 4,240,816) and WAIBEL et al. (Properties of TiO_x films) as applied to claims 42-44 and 48-51 above, and further in view of GREENSBURG et al. (US 2002/0114945 A1).

HISHINUMA et al. as modified by MCMASTER et al. and WAIBEL et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). Modified HISHINUMA et al. fails to disclose the area treated. GREENSBURG et al. discloses a method for the production of a photocatalytic on a glass substrate (abstract) using spray pyrolysis (para. 20, line 3). GREENBERG et al. discloses that the coating can be titanium oxide (para. 20, line 6). GREENBERG et al. discloses an example in which titanium dioxide is sprayed on a glass substrate using spray pyrolysis (example 4) wherein the sample glass has dimensions of 10.16 cm x 10.16 cm, which would have an area of 0.01 m². Since the glass used in GREENBERG et al. can be at least 0.01 m² it would be obvious that the range would cover areas of 0.5 m² and above. It would have been obvious to use the same sized glass in the process of modified HISHINUMA et al. because they both produce a glass substrate with a titanium oxide film by the use of pyrolysis spray. Therefore, the claimed invention would have been obvious.

19. Claims 47 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of MCMASTER et al. (US 4,240,816) and WAIBEL et al. (Properties of TiO_x films) as applied to claims 42-44 and 48-51 above, and further in view of DOUSHITA et al. (US 6,156,409).

HISHINUMA et al. as modified by MCMASTER et al. and WAIBEL et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). Modified HISHINUMA et al. fails to disclose the

surfactant. DOUSHITA et al. discloses a process for producing glass articles with a non-fogging film using metal oxides (abstract). DOUSHITA et al. discloses the use of a surfactant in the film (claim 1). It would be obvious to use a surfactant in the film of modified HISHINUMA et al. because the surfactant improves the anti-fogging property (col. 8, lines 4-6) and would cover stain constituents (col. 8, lines 16-18) which is a desirable trait in glass sheets. DOUSHITA et al. also discloses that the film has an arithmetic mean roughness of 1.5 to 80 nm (abstract), which would overlap with the range in instant claim 52. It is obvious that the film on the glass of modified HISHINUMA et al would have the same properties because they both teach a glass substrate with a titanium oxide film. Therefore, the claimed invention would have been obvious.

20. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over HISHINUMA et al (WO 200117922 A1) in view of MCMASTER et al. (US 4,240,816) and WAIBEL et al. (Properties of TiO_x films) as applied to claims 42-44 and 48-51 above, and further in view of NIWA et al. (US 6,408,743 B2).

HISHINUMA et al. as modified by MCMASTER et al. and WAIBEL et al. discloses an apparatus for the production of a glass sheet with photocatalytic titanium oxide film (DERWENT abstract). Modified HISHINUMA et al. discloses that if the thickness of the film exceeds 1.0 um, then the luster and haze may be become high and may not be suitable for practical use (trans. para. 21). Modified HISHINUMA et al. is silent as to what values are considered high. NIWA et al. discloses that a glass haze of

5% or less is considered to be desirable, which incorporates the range of instant claim 41. It is obvious that the glass of modified HISHINUMA et al. would preferably contain a haze of less than 5% because that is considered suitable for practical use. Therefore, the claimed invention would have been obvious.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA SZEWCZYK whose telephone number is (571)270-5130. The examiner can normally be reached on Monday through Thursday 7:30 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571) 272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Barbara L. Gilliam/
Supervisory Patent Examiner, Art
Unit 4128

CS